REMARKS

Claims 97, 135, and 164-172 were cancelled and replaced with claims 173-192, which are currently pending in the above-captioned application for the Examiner's review and consideration. New claim 173 is a combination of the subject matter of previously pending claims 97, 130, and 135. New claim 174 recites the subject matter of previously pending claim 172. New claims 175-177 recite the subject matter of previously pending claims 132-134, which were noted to be generic to Groups I-III on page 6 of the Office Action dated March 12, 2002 (Group I was elected). New claim 178 recites the subject matter of previously pending claim 170, but which is now dependent upon any one of claims 173-177. New claims 179-182 all depend from claim 173 and each recite specific types of polarizers, as stated in the specification, *e.g.*, at pages 51-53. New claim 183 is a combination of the subject matter of previously pending claims 97, 135, and 172. New claim 184 recites the subject matter of previously pending claim 130. New claims 185-187 recite the subject matter of previously pending claims 132-134, which were noted to be generic to Groups I-III on page 6 of the Office Action dated March 12, 2002 (Group I was elected). New claim 188 recites the subject matter of previously pending claim 170, but which is now dependent upon any one of claims 183-187. New claims 189-192 all depend from claim 183 and each recite specific types of polarizers, as stated in the specification, *e.g.*, at pages 51-53. As no new matter has been added by these amendments, Applicants respectfully submit their entry into the record of the above-captioned application is warranted at this time.

In addition, Applicants appreciate the courtesies extended by Examiner Hon during a telephone interview on August 5, 2003, with Applicants' representative David Weisberg. During this telephone interview, Applicants' representative discussed with the Examiner the substance of the prior art disclosures and their impact on the then-pending claims, resulting in a tentative agreement on allowable subject matter if claims 97, 130, and 135 were combined, as well as if claims 97, 135, and 172 were combined. The remarks herein are substantially in accord with the substance of this telephone interview, in combination with the statements in the Office Action dated August 20, 2003.

The Pending Claims Are Not Obvious Over the Cited Art

In the Office Action dated August 20, 2003, claims 97, 135, and 172 were rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,739,296 to Gvon *et al.* ("Gvon"), in view of U.S. Patent No. 5,712,024 to Okuzaki *et al.* ("Okuzaki") and further in view of International Publication No. WO 95/17691 to Minnesota Mining and Manufacturing Company ("Ouderkirk"), for the reasons set forth on pages 2-5 thereof. The rejection of these claims has been rendered moot by Applicants' cancellation of these claims. However, Applicants respectfully traverse this rejection with respect to new claims 173-192 for the reasons set forth below.

Gvon teaches "thermostable and lightfast dichroic polarizers which are based on polarizing coatings and which have high polarizing characteristics." *See* Gvon, first sentence of the Summary of the Invention. The polarizing coatings of Gvon "are formed from dyestuffs which provide a stable liquid crystalline phase in a wide range of concentrations, temperatures and pH values" when they are placed on a support surface, or between two support surfaces, and oriented. *See Id.* at Abstract. According to Gvon, the dyestuffs are water-soluble, organic, and "of the formula {Chromogen} $(SO_3M)_n$ and their mixtures." *See Id.* at column 5, lines 45-46.

Okuzaki teaches a laminated anti-reflection film composed of an uppermost film layer containing coloring matter having an absorbing peak between 700-900 nm and/or between 600-700 nm and a next film layer containing coloring matter having an absorbing peak between 500-600 nm. *See* Okuzaki at Abstract. According to Okuzaki, the uppermost film is predominantly a SiO_2 (glass) film, and the adjoining film is predominantly a SnO_2, ZnO, or ITO (indium tin oxide) film. *See Id.* at column 8, lines 41-55.

The Examiner alleged that the Gvon teaches a polarizer comprising a birefringent layer on a birefringent polymeric film substrate. *See* Office Action at page 3. The Examiner previously noted that Gvon fails to specifically disclose abnormal dispersion, but now asserts that this quality is inherent because of the disclosure of Okuzaki below. *See Id.* The Examiner, however, does acknowledge that Gvon fails to disclose that the thickness of the layer is such that the output of the polarizer coincides with an interference extremum of a linearly-polarized light component.

The Examiner alleged that Okuzaki teaches a dye that has anisotropic absorbance, as indicated by a peak in the refractive index vs. wavelength curve. The Examiner also alleged that the anisotropic absorbance of the Okuzaki dye necessarily also contained an abnormal dispersion, *i.e.*, an increase of refractive index on the upside of the peak in the 400-700 nm range of incident wavelength. *See* Office Action at page 3. The Examiner also alleged that this disclosure in Okuzaki means that the layer of Gvon necessarily exhibits abnormal dispersion. *See Id.*

The Examiner alleged that Ouderkirk teaches layers having an optical thickness of not less than a wavelength of light, so that constructive interference can be exploited to improve the optical performance of the polarizer at the selected wavelength. *See* Office Action at page 4.

The Examiner then concluded that, although abnormal dispersion and thickness resulting in interference extremum were not disclosed *per se* in Gvon, the combination of Gvon, Okuzaki, and Ouderkirk rendered the claims obvious. *See Id.* Applicants respectfully trasverse.

Applicants respectfully submit that claim 97, as previously presented, required four features of the polarizer layer: (1) it must be birefringent; (2) it must be anisotropically absorbing; (3) it must have abnormal dispersion, which is defined as an increase in at least one refractive index coefficient with increasing wavelength; and (4) the thickness being such that an output of the polarizer coincides with an interference extremum of a linearly-polarized light component. Applicants respectfully submit that Gvon, Okuzaki, or Ouderkirk, whether individually or in combination, do not disclose or suggest combining these specific features in a poalrizer layer, as presently claimed.

Furthermore, new claims 173 and 179, aside from reciting material(s) from which the birefringent and anisotropically absorbing layer is formed, further recite: (a) materials having a first refractive index that is directly proportional to the polarizable light wavelength, at least for a certain range of wavelengths; and (b) that the first refractive index of the at least one birefringent and anisotropically absorbing layer has a maximal value of at least 1.9, respectively. Applicants respectfully submit that Gvon, Okuzaki, or Ouderkirk, whether individually or in combination, do not disclose or suggest these additional features in a polarizer layer, much less in combination with the four features discussed above.

The Examiner alleged that Gvon teaches that its polarizing coating is both anisotropically absorbing and birefringent. Applicants respectfully disagree and note that Gvon does not mention birefringence with respect to its polarizing coating, but only suggests that when one of the substrates is polymeric, *e.g.*, is poly(ethylene terephthalate) or PET, the substrate, not the polarizing coating, can be birefringent. *See* Gvon at column 9, lines 62-67 and Fig. 6. Applicants can find no disclosure or suggestion in Gvon of a polarizing or coating layer that can exhibit birefringence properties, much less in combination with anisotropic absorption and abnormal dispersion, as presently claimed. Applicants have reviewed the Polymer Science Dictionary, referred to at page 5 of the Office Action, which indicates that optical anisotropy may be a synonym for birefringence, with which Applicants do not necessarily agree and to which definition Applicants expressly do not concede. Applicants respectfully submit that anisotropy arising from orientation of molecules, such as liquid crystals, does not necessarily result in optical anisotropy or birefringence. Moreover, while optical anisotropy is mentioned in Gvon, the reference teaches that its dyestuff compounds do not exhibit optical anisotropy in all situations. Indeed, Gvon discloses that the alignment of lyotropic LC phases having dyestuffs of formulae I-VII do not necessarily cause optical anisotropy (*i.e.*, such materials "were used in non-polarizing situations"). *See* Gvon at column 6, lines 4-5. Because the teachings of Gvon are divergent in this respect, Applicants respectfully submit that they cannot properly be the sole basis for finding birefringence in a polarizing layer.

Further Applicants respectfully submit a more accurate definition of birefringence: "The resolution or splitting of a light wave into two unequally reflected waves by an optically anisotropic medium." *See* The American Heritage College Dictionary, 3rd ed., 1997, page 141 (a copy of which is attached hereto for the Examiner's convenience). This definition, which Applicants respectfully submit is a more accurate definition, requires not only that the medium be optically anisotropic, but also that a light wave be unequally resolved/split by the optically anisotropic medium. Applicants respectfully submit that the disclosure of optical anisotropy in one instance in Gvon is insufficient to establish that Gvon's layer is necessarily birefringent, as there is no description of unequal resolution/splitting of

light waves in conjunction with the optical anisotropy. As a result, Applicants maintain that Gvon does not teach birefringence in a polarizing layer.

Applicants respectfully note that, although Gvon discloses an anisotropically absorbing layer, this does not *a priori* indicate that the layer also exhibits birefringence. *See* Inventors' Rule 132 Declaration at ¶9, filed previously as an attachment to Applicants' Preliminary Amendment dated May 23, 2003. In addition, there is absolutely no disclosure or suggestion in Gvon to combine anisotropic absorbance with either birefringence or optical anisotropy in a polarizing coating layer, much less combined with the quality of abnormal dispersion, as presently claimed. In order to find birefringence in such a layer, it would be necessary, at a minimum, to combine the birefringent quality of the substrate and the anisotropically absorbing quality of the coating and put them into a single layer. There is absolutely no such suggestion provided in Gvon to do this.

Applicants also submit that Okuzaki does not remedy the deficiencies of Gvon with respect to birefringence of the non-substrate layer. The Examiner asserts that Okuzaki is used to show alleged "inherency" of the combination of abnormal dispersion and anisotropic absorption. However, Applicants respectfully submit that even the combination of Gvon and Okuzaki does not disclose or suggest all the elements of the instantly pending claims. Indeed, Okuzaki does not disclose birefringence at all, whether in the substrate or in its dual-layer, laminated, anti-reflection film.

Unlike the polarizer disclosed in Gvon, the polarizer used in the claimed invention also requires "abnormal dispersion," *i.e.*, the birefringent and anisotropically absorbing layer has a refraction index that increases as the wavelength of polarizable light increases over a range of the spectrum of wavelengths (*See, e.g.*, the instant specification, page 56, lines 3-11). There is absolutely no disclosure or suggestion in Gvon that the polarizer disclosed therein should have the property of "abnormal dispersion," as presently claimed. As shown in the attached Declaration of the Inventors, there is no suggestion in Gvon to select the property of abnormal dispersion over normal dispersion in coating layers. *See, e.g.*, the Inventors' Rule 132 Declaration at Appendix, Figs. 1-2 (previously submitted with the Preliminary Amendment dated May 23, 2003); *see also id.* at ¶¶8-10.

Applicants also submit that Okuzaki does not remedy the deficiencies of Gvon with respect to teaching abnormal dispersion. Although the Examiner previously asserted that Okuzaki is a teaching reference for the alleged "inherency" of the combination of abnormal dispersion and anisotropic absorption and not to remedy any deficiencies in Gvon, Applicants respectfully point out that the Examiner's logic in this respect is flawed.

Applicants respectfully submit that one of ordinary skill in the art could not possibly predict *a priori*, based on Okuzaki, whether the polarizing coating of Gvon exhibits the abnormal dispersion in the polarizing coating of Gvon, much less the specific combination of birefringence, abnormal disperson, and anisotropic absorption. Applicants previously provided data indicating that the presence of a dye taught by Okuzaki is not sufficient for attaining abnormal dispersion in a dyed film or in a dye layer. *See* the Inventors' Rule 132 Declaration at ¶¶8-10. This conclusion was confirmed experimentally and with calculations on dyes used in Gvon. *See Id.*; *see also id.* at Appendix, Figs. 1-2. Thus, the combination of Gvon and Okuzaki also does not teach the specific combination of birefringence with abnormal dispersion, much less with anisotropic absorption.

The Examiner has noted that Applicants' Declaration is defective (*see* Office Action at page 5), because the refractive index vs. wavelength behavior of Gvon's dyes #1 and #2 were reported only over the range of about 0.4 to about 0.75 microns, whereas the peak absorbance of dye #2 occurred outside that wavelength. Applicants respectfully submit that there is no reason for Applicants' data to include the refractive index behavior at the point of peak absorbance (which is at about 300 nm). Applicants have noted no special behavior of the refractive index vs. wavelength curve at peak absorption in dye #2, and, unless the Examiner has some scientific reason to believe that there is likely special behavior of the refractive index vs. wavelength curve at peak absorption in dye #1, Applicants respectfully submit that their previously submitted Declaration is not deficient. Indeed, while the range of wavelengths over which Gvon's dyes may be useful can include those outside Applicants' measured ranges, Gvon itself recognizes the 0.4-0.8 micron range (*i.e.*, which roughly corresponds to the wavelengths of the visible spectrum) as an especially important range of wavelengths. *See* Gvon at column 8, line 50.

In addition, Applicants do not follow the Examiner's logic of Okuzaki alleged inherency. The Examiner has indicated at pages 3-4 of the Office Action that the maximum in the curve of absorption vs. wavelength of the dyes of Gvon occur in the range between 400 and 700 nm and concludes that Gvon, through Okuzaki, inherently discloses that there is necessarily a positive slope in the refractive index vs. wavelength curve. One does not follow the other, despite the disclosure of Okuzaki. The slope of the refractive index vs. wavelength does not necessarily become positive at any point, regardless of maxima or minima in absorption. Applicants further respectfully submit that their previously presented data for dye #2 affirmatively rebuts such logic, showing that no maximum or minimum *necessarily* occurs in the refractive index vs. wavelength curve at an extremum in the absorption vs. wavelength curve. Applicants respectfully submit that there is no reason to assume that Gvon's dye #1 behaves any differently with respect to refractive index in the wavelength region surrounding its maximum absorption, especially because of the data supplied by Applicants with respect to Gvon's dye#1. Thus, Gvon's dye #2 teaches away from the disclosure of Okuzaki with respect to abnormal dispersion, and, if for no other reason, Applicants respectfully submit that such divergent teachings mean that the two references cannot effectively be combined.

Similarly, neither Gvon nor Okuzaki teach to combine anisotropic absorbance with birefringence and abnormal absorption. While Gvon specifically teaches its coating layer should be anisotropically absorbing, Okuzaki is silent with respect to whether the absorption is isotropic or anisotropic. There is nothing in either reference that would motivate one of ordinary skill in the art to select anisotropic absorption in a polarizing/coating layer, to combine it with abnormal dispersion, and then to further combine it with birefringence. Indeed, the mere appearance of an absorption peak in the refractive index-wavelength plot for a material does not indicate whether that material is anisotropically absorbing or isotropically absorbing, but only that the material absorbs light at a particular (range of) wavelength(s). *See* the Inventors' Rule 132 Declaration at ¶8. Therefore, from the disclosure of Okuzaki, it is not obvious that the presence of a dye having some absorption peak, whether isotropic or anisotropic, in the film must necessarily exhibit abnormal dispersion.

Neither does Ouderkirk remedy the deficiencies of Gvon or Okuzaki. The Examiner cites Ouderkirk for the statement that "if the layers have an optical

thickness less than a wavelength of light, then constructive intereference can be exploited to improve the optical performance of the polarizer at the selected wavelength." *See* Office Action at page 4 (citing Ouderkirk, column 4, lines 8-10). However, the broader passage from which this statement is paraphrased describes the thickness range of Ouderkirk's layers, noting that "[b]oth thick and thin film constructions are useful." *See* Ouderkirk at column 6, lines 5-6. This passage in Ouderkirk does not teach one of ordinary skill in the art to chose any particular thickness of layer, nor specifically Applicants' claimed thickness to coincide with an interference extremum, but only suggests a layer thickness range that can be thicker than multiple times the wavelength of light or thinner than even a single wavelength of light. *See Id.* at lines 4-10. Thus, Applicants respectfully submit that Ouderkirk does not effectively teach a layer thickness such that the output of the polarizer coincides with an interference extremum, as presently claimed.

However, Applicants have explained at least one other difference between Ouderkirk and the presently claimed invention, *i.e.*, that the polarizer in Ouderkirk "includes interleaved layers of two *transparent* (non-absorbing in the operating wavelength range) polymer materials." *See* the specification, specifically the New Translation of Specification of English Translation Submitted as Item 6, at page 2, lines 30-31. Thus, Applicants have distinguished Ouderkirk from the presently claimed invention in that the Ouderkirk layers are non-absorbing (and therefore not anisotropically absorbing). Further, there is no disclosure or suggestion in Ouderkirk that the layers are abnormally dispersive.

Applicants respectfully submit that, although Gvon, Okuzaki, and Ouderkirk may all relate to polarizing layers, the polarizers and/or devices to which they relate are different. Indeed, the properties which have been picked and chosen, seemingly arbitrarily, from each of these references are representative of materials useful for vastly different types of polarizers. Gvon teaches coatings used in dichroic polarizers (*see* Gvon Abstract); Okuzaki teaches anti-reflective films used in displays or CRTs (*see* Okuzaki at column 1, lines 6-10); and Ouderkirk teaches a combination reflective/dichroic polarizer (*see* Ouderkirk Abstract). Indeed, the passage in Ouderkirk that the Examiner cites for combination with Okuzaki and Gvon is taken from the section describing the reflective polarizer layer, not the section describing the dichroic polarizer layer. Applicants' own specification recognizes the

applicability of the feature reciting that the thickness of the layer be coincident with an interference extremum in non-dichroic polarizers. *See* instant specification translation (item 6) at page 23, lines 27-30. Applicants respectfully submit that at least new claims 179-181 and 189-191, directed to polarizers that are not reflective, should be allowable. Even Ouderkirk does not disclose or suggest this thickness requirement for its dichroic polarizer layer (*see supra*). Thus, the motivation for its selection and combination with the dichroic polarizer layer disclosed in Gvon cannot be established. At the very least, even with a combination of art believed to be analogous to the instantly claimed invention, such a distinction raises significant doubts as to the reasonable expectation of success of such a combination by one of ordinary skill in the art.

Applicants therefore respectfully maintain that the Examiner is improperly using hindsight to pick and choose the presently pending claim elements from non-analogous, divergent-teaching prior art. Improper hindsight cannot be used to reject a claim as obvious. *In re Sernaker*, 702 F.2d 989, 994 (Fed. Cir. 1983); *In re Rinehart*, 531 F.2d 1048 (CCPA 1976); *In re Imperato*, 486 F.2d 585 (CCPA 1973); *In re Adams*, 356 F.2d 998 (CCPA 1966). Consequently, it is legally improper to select from the prior art the separate components of the inventor's combination, using the blueprint supplied by the inventor. *C.R. Bard Inc. v. M3 Systems, Inc.*, 157 F.3d 1340, 1352 (Fed. Cir. 1998) citing *Fromson v. Advance Offset Plate, Inc.*, 755 F.2d 1549, 1556 (Fed. Cir. 1985) (holding the prior art must suggest to one of ordinary skill in the art the desirability of the claimed combination). The Federal Circuit has suggested that "the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or modification to combine prior art references." *Id.* (emphasis added). This is because " when prior art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gleaned from the invention itself." *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1142 (Fed. Cir. 1985).

For any of the foregoing reasons, Applicants respectfully submit that the presently amended claims are not obvious over Gvon, Okuzaki, or Ouderkirk, alone or in combination. As a result, Applicants respectfully request that the obviousness rejection be reconsidered and withdrawn.

Applicants respectfully submit that the entire application is now in condition for allowance, early notice of which would be greatly appreciated. Should the Examiner disagree, Applicants request that the Examiner contact the undersigned for a telephonic or in-person interview to resolve any remaining issues regarding the prosecution of the above-captioned application.

No fee is believed to be due for this submission. Should any fee be required, however, please charge the required fee to Pennie & Edmonds LLP Deposit Account No. 16-1150.

Respectfully submitted,

Date: December 19, 2003

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Attachment